SEQUENCE LISTING

<110>   University of Kentucky Research Foundation
        Moscow, Jeffrey A.
        Jordan, Craig
        Xin, Lu

<120>   AN ORGANIC CATION TRANSPORTER PREFERENTIALLY EXPRESSED IN
        HEMATOPOIETIC CELLS

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          50              55                  60

      Asn Ser Val Pro Leu Arg Leu Arg Asp Gly Arg Glu Val Pro His Ser
      65              70                  75                      80

      Cys Ser Arg Tyr Arg Leu Ala Thr Ile Ala Asn Phe Ser Ala Leu Gly
                  85                  90                  95

      Leu Glu Pro Gly Arg Asp Val Asp Leu Gly Gln Leu Glu Gln Glu Ser
                  100                 105                 110

      Cys Leu Asp Gly Trp Glu Phe Ser Gln Asp Val Tyr Leu Ser Thr Val
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      Val Thr Glu Trp Asn Leu Val Cys Glu Asp Asn Trp Lys Val Pro Leu
          130                 135                 140

      Thr Thr Ser Leu Phe Phe Val Gly Val Leu Leu Gly Ser Phe Val Ser
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      Gly Gln Leu Ser Asp Arg Phe Gly Arg Lys Asn Val Leu Phe Ala Thr
                  165                 170                 175

      Met Ala Val Gln Thr Gly Phe Ser Phe Leu Gln Ile Phe Ser Ile Ser
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      Ser Asn Tyr Val Val Ala Phe Ile Leu Gly Thr Glu Ile Leu Gly Lys
          210                 215                 220

      Ser Val Arg Ile Ile Phe Ser Thr Leu Gly Val Cys Thr Phe Phe Ala
      225                 230                 235                 240

      Val Gly Tyr Met Leu Leu Pro Leu Phe Ala Tyr Phe Ile Arg Asp Trp
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      Arg Met Leu Leu Leu Ala Leu Thr Val Pro Gly Val Leu Cys Val Pro
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Leu Trp Trp Phe Ile Pro Glu Ser Pro Arg Trp Leu Ile Ser Gln Arg
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Arg Phe Arg Glu Ala Glu Asp Ile Ile Gln Lys Ala Ala Lys Met Asn
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Pro Leu Lys Gln Gln Lys Ala Phe Ile Leu Asp Leu Phe Arg Thr Arg
            325   330   335

Asn Ile Ala Ile Met Thr Ile Met Ser Leu Leu Leu Trp Met Leu Thr
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Ser Val Gly Tyr Phe Ala Leu Ser Leu Asp Ala Pro Asn Leu His Gly
        355   360   365

Asp Ala Tyr Leu Asn Cys Phe Leu Ser Ala Leu Ile Glu Ile Pro Ala
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Tyr Ile Thr Ala Trp Leu Leu Leu Arg Thr Leu Pro Arg Arg Tyr Ile
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Ile Ala Ala Val Leu Phe Trp Gly Gly Gly Val Leu Leu Phe Ile Gln
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Leu Val Pro Val Asp Tyr Tyr Phe Leu Ser Ile Gly Leu Val Met Leu
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Gly Lys Phe Gly Ile Thr Ser Ala Phe Ser Met Leu Tyr Val Phe Thr
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Ala Glu Leu Tyr Pro Thr Leu Val Arg Asn Met Ala Val Gly Val Thr
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Ser Thr Ala Ser Arg Val Gly Ser Ile Ile Ala Pro Tyr Phe Val Tyr
465   470   475   480

Leu Gly Ala Tyr Asn Arg Met Leu Pro Tyr Ile Val Met Gly Ser Leu
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Thr Val Leu Ile Gly Ile Leu Thr Leu Phe Phe Pro Glu Ser Leu Gly
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Met Thr Leu Pro Glu Thr Leu Glu Gln Met Gln Lys Val Lys Trp Phe
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Arg Ser Gly Lys Lys Thr Arg Asp Ser Met Glu Thr Glu Glu Asn Pro
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Lys Val Leu Ile Thr Ala Phe
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            20   25   30

Pro Phe Tyr Phe Phe Ala His Val Phe Met Val Leu Asp Glu Pro His
        35   40   45

His Cys Ala Val Ala Trp Val Lys Asn His Thr Phe Asn Leu Ser Ala
    50   55   60

Ala Glu Gln Leu Val Leu Ser Val Pro Leu Asp Thr Ala Gly His Pro
65   70   75   80

Glu Pro Cys Leu Met Phe Arg Pro Pro Ala Asn Ala Ser Leu Gln
            85   90   95

Asp Ile Leu Ser His Arg Phe Asn Glu Thr Gln Pro Cys Asp Met Gly
            100   105   110

Trp Glu Tyr Pro Glu Asn Arg Leu Pro Ser Leu Lys Asn Glu Phe Asn
        115   120   125

Leu Val Cys Asp Arg Lys His Leu Lys Asp Thr Thr Gln Ser Val Phe
    130   135   140

Met Gly Gly Leu Leu Val Gly Thr Leu Met Phe Gly Pro Leu Cys Asp
145   150   155   160

Arg Ile Gly Arg Lys Ala Thr Ile Leu Ala Gln Leu Leu Leu Phe Thr
            165   170   175

Leu Ile Gly Leu Ala Thr Ala Phe Val Pro Ser Phe Glu Leu Tyr Met
            180   185   190

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Ala Leu Arg Phe Ala Val Ala Thr Ala Val Ala Gly Leu Ser Phe Ser
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Asn Val Thr Leu Leu Thr Glu Trp Val Gly Pro Ser Trp Arg Thr Gln
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Ala Val Val Leu Ala Gln Cys Asn Phe Ser Leu Gly Gln Met Val Leu
225             230             235             240

Ala Gly Leu Ala Tyr Gly Phe Arg Asn Trp Arg Leu Leu Gln Ile Thr
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Gly Thr Ala Pro Gly Leu Leu Leu Phe Phe Tyr Phe Trp Ala Leu Pro
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Glu Ser Ala Arg Trp Leu Leu Thr Arg Gly Arg Met Asp Glu Ala Ile
        275             280             285

Gln Leu Ile Gln Lys Ala Ala Ser Val Asn Arg Arg Lys Leu Ser Pro
    290             295             300

Glu Leu Met Asn Gln Leu Val Pro Glu Lys Thr Gly Pro Ser Gly Asn
305             310             315             320

Ala Leu Asp Leu Phe Arg His Pro Gln Leu Arg Lys Val Thr Leu Ile
            325             330             335

Ile Phe Cys Val Trp Phe Val Asp Ser Leu Gly Tyr Tyr Gly Leu Ser
        340             345             350

Leu Gln Val Gly Asp Phe Gly Leu Asp Val Tyr Leu Thr Gln Leu Ile
    355             360             365

Phe Gly Ala Val Glu Val Pro Ala Arg Cys Ser Ser Ile Phe Met Met
    370             375             380

Gln Arg Phe Gly Arg Lys Trp Ser Gln Leu Gly Thr Leu Val Leu Gly
385             390             395             400

Gly Leu Met Cys Ile Ile Ile Ile Phe Ile Pro Ala Asp Leu Pro Val
            405             410             415

Val Val Thr Met Leu Ala Val Val Gly Lys Met Ala Thr Ala Ala Ala
            420             425             430

Phe Thr Ile Ser Tyr Val Tyr Ser Ala Glu Leu Phe Pro Thr Ile Leu
    435             440             445
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Arg Gln Thr Gly Met Gly Leu Val Gly Ile Phe Ser Arg Ile Gly Gly
    450             455             460
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Ile Leu Thr Pro Leu Val Ile Leu Leu Gly Glu Tyr His Ala Ala Leu
465             470             475             480
```

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Pro Met Leu Ile Tyr Gly Ser Leu Pro Ile Val Ala Gly Leu Leu Cys
            485             490             495
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Thr Leu Leu Pro Glu Thr His Gly Gln Gly Leu Lys Asp Thr Leu Gln
        500             505             510
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Asp Leu Glu Leu Gly Pro His Pro Arg Ser Pro Lys Ser Val Pro Ser
        515             520             525
```

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Glu Lys Glu Thr Glu Ala Lys Gly Arg Thr Ser Ser Pro Gly Val Ala
    530             535             540
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Phe Val Ser Ser Thr Tyr Phe
545             550
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1               5               10              15
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Phe Gln Arg Leu Ile Phe Phe Leu Leu Ser Ala Ser Ile Ile Pro Asn
            20              25              30
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Gly Phe Thr Gly Leu Ser Ser Val Phe Leu Ile Ala Thr Pro Glu His
        35              40              45
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Arg Cys Arg Val Pro Asp Ala Ala Asn Leu Ser Ser Ala Trp Arg Asn
    50              55              60
```

```
His Thr Val Pro Leu Arg Leu Arg Asp Gly Arg Glu Val Pro His Ser
65              70              75              80
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Cys Arg Arg Tyr Arg Leu Ala Thr Ile Ala Asn Phe Ser Ala Leu Gly
            85              90              95
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Leu Glu Pro Gly Arg Asp Val Asp Leu Gly Gln Leu Glu Gln Glu Ser
            100             105             110
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Cys Leu Asp Gly Trp Glu Phe Ser Gln Asp Val Tyr Leu Ser Thr Ile
        115   120   125

Val Thr Glu Trp Asn Leu Val Cys Glu Asp Asp Trp Lys Ala Pro Leu
130   135   140

Thr Ile Ser Leu Phe Phe Val Gly Val Leu Leu Gly Ser Phe Ile Ser
145   150   155   160

Gly Gln Leu Ser Asp Arg Phe Gly Arg Lys Asn Val Leu Phe Val Thr
                165   170   175

Met Gly Met Gln Thr Gly Phe Ser Phe Leu Gln Ile Phe Ser Lys Asn
            180   185   190

Phe Glu Met Phe Val Val Leu Phe Val Leu Val Gly Met Gly Gln Ile
        195   200   205

Ser Asn Tyr Val Ala Ala Phe Val Leu Gly Thr Glu Ile Leu Gly Lys
    210   215   220

Ser Val Arg Ile Ile Phe Ser Thr Leu Gly Val Cys Ile Phe Tyr Ala
225   230   235   240

Phe Gly Tyr Met Val Leu Pro Leu Phe Ala Tyr Phe Ile Arg Asp Trp
            245   250   255

Arg Met Leu Leu Val Ala Leu Thr Met Pro Gly Val Leu Cys Val Ala
            260   265   270
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Leu Trp Trp Phe Ile Pro Glu Ser Pro Arg Trp Leu Ile Ser Gln Gly
        275   280   285

Arg Phe Glu Glu Ala Glu Val Ile Ile Arg Lys Ala Ala Lys Ala Asn
    290   295   300

Gly Ile Val Val Pro Ser Thr Ile Phe Asp Pro Ser Glu Leu Gln Asp
305   310   315   320

Leu Ser Ser Lys Lys Gln Gln Ser His Asn Ile Leu Asp Leu Leu Arg
                325   330   335

Thr Trp Asn Ile Arg Met Val Thr Ile Met Ser Ile Met Leu Trp Met
            340   345   350

Thr Ile Ser Val Gly Tyr Phe Gly Leu Ser Leu Asp Thr Pro Asn Leu

            355   360   365

His Gly Asp Ile Phe Val Asn Cys Phe Leu Ser Ala Met Val Glu Val
    370   375   380

Pro Ala Tyr Val Leu Ala Trp Leu Leu Leu Gln Tyr Leu Pro Arg Arg
385   390   395   400

Tyr Ser Met Ala Thr Ala Leu Phe Leu Gly Gly Ser Val Leu Leu Phe
                405   410   415

Met Gln Leu Val Pro Pro Asp Leu Tyr Tyr Leu Ala Thr Val Leu Val
            420   425   430

Met Val Gly Lys Phe Gly Val Thr Ala Ala Phe Ser Met Val Tyr Val
            435   440   445

Tyr Thr Ala Glu Leu Tyr Pro Thr Val Val Arg Asn Met Gly Val Gly
    450   455   460

Val Ser Ser Thr Ala Ser Arg Leu Gly Ser Ile Leu Ser Pro Tyr Phe
465   470   475   480

Val Tyr Leu Gly Ala Tyr Asp Arg Phe Leu Pro Tyr Ile Leu Met Gly
                485   490   495

Ser Leu Thr Ile Leu Thr Ala Ile Leu Thr Leu Phe Leu Pro Glu Ser
            500   505   510

Phe Gly Thr Pro Leu Pro Asp Thr Ile Asp Gln Met Leu Arg Val Lys
            515   .   520   525   .

Gly Met Lys His Arg Lys Thr Pro Ser His Thr Arg Met Leu Lys Asp
    530   535   540

Gly Gln Glu Arg Pro Thr Ile Leu Lys Ser Thr Ala Phe
545   550   555

<210> 7
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<212> PRT
<213> Homo sapiens

<400> 7

Met Pro Thr Thr Val Asp Asp Val Leu Glu His Gly Gly Glu Phe His
1   5   10   15

Phe Phe Gln Lys Gln Met Phe Phe Leu Leu Ala Leu Leu Ser Ala Thr

                                    20   25   30

Phe Ala Pro Ile Tyr Val Gly Ile Val Phe Leu Gly Phe Thr Pro Asp
        35   40   45

His Arg Cys Arg Ser Pro Gly Val Ala Glu Leu Ser Leu Arg Cys Gly
    50   55   60

Trp Ser Pro Ala Glu Glu Leu Asn Tyr Thr Val Pro Gly Pro Gly Pro
65   70   75   80

Ala Gly Glu Ala Ser Pro Arg Gln Cys Arg Arg Tyr Glu Val Asp Trp
                85   90   95

Asn Gln Ser Thr Phe Asp Cys Val Asp Pro Leu Ala Ser Leu Asp Thr
            100   105   110

Asn Arg Ser Arg Leu Pro Leu Gly Pro Cys Arg Asp Gly Trp Val Tyr
            115   120   125

Glu Thr Pro Gly Ser Ser Ile Val Thr Glu Phe Asn Leu Val Cys Ala
    130   135   140

Asn Ser Trp Met Leu Asp Leu Phe Gln Ser Ser Val Asn Val Gly Phe
145   150   155   160

Phe Ile Gly Ser Met Ser Ile Gly Tyr Ile Ala Asp Arg Phe Gly Arg
                165   170   175

Lys Leu Cys Leu Leu Thr Thr Val Leu Ile Asn Ala Ala Ala Gly Val
            180   185   190

Leu Met Ala Ile Ser Pro Thr Tyr Thr Trp Met Leu Ile Phe Arg Leu
        195   200   205

Ile Gln Gly Leu Val Ser Lys Ala Gly Trp Leu Ile Gly Tyr Ile Leu
    210   215   220

Ile Thr Glu Phe Val Gly Arg Arg Tyr Arg Arg Thr Val Gly Ile Phe
225   230   235   240

Tyr Gln Val Ala Tyr Thr Val Gly Leu Leu Val Leu Ala Gly Val Ala
                245   250   255

Tyr Ala Leu Pro His Trp Arg Trp Leu Gln Phe Thr Val Ala Leu Pro
            260   265   270

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Asn Phe Phe Phe Leu Leu Tyr Tyr Trp Cys Ile Pro Glu Ser Pro Arg
    275   280   285

Trp Leu Ile Ser Gln Asn Lys Asn Ala Glu Ala Met Arg Ile Ile Lys
    290   295   300

His Ile Ala Lys Lys Asn Gly Lys Ser Leu Pro Ala Ser Leu Gln Arg
305   310   315   320

Leu Arg Leu Glu Glu Glu Thr Gly Lys Lys Leu Asn Pro Ser Phe Leu
          325   330   335

Asp Leu Val Arg Thr Pro Gln Ile Arg Lys His Thr Met Ile Leu Met
        340   345   350

Tyr Asn Trp Phe Thr Ser Ser Val Leu Tyr Gln Gly Leu Ile Met His
      355   360   365

Met Gly Leu Ala Gly Asp Asn Ile Tyr Leu Asp Phe Phe Tyr Ser Ala
    370   375   380

Leu Val Glu Phe Pro Ala Ala Phe Met Ile Ile Leu Thr Ile Asp Arg
385   390   395   400

Ile Gly Arg Arg Tyr Pro Trp Ala Ala Ser Asn Met Val Ala Gly Ala
        405   410   415

Ala Cys Leu Ala Ser Val Phe Ile Pro Gly Asp Leu Gln Trp Leu Lys
        420   425   430

Ile Ile Ile Ser Cys Leu Gly Arg Met Gly Ile Thr Met Ala Tyr Glu
      435   440   445

Ile Val Cys Leu Val Asn Ala Glu Leu Tyr Pro Thr Phe Ile Arg Asn
    450   455   460

Leu Gly Val His Ile Cys Ser Ser Met Cys Asp Ile Gly Gly Ile Ile
465   470   475   480

Thr Pro Phe Leu Val Tyr Arg Leu Thr Asn Ile Trp Leu Glu Leu Pro
        485   490   495

Leu Met Val Phe Gly Val Leu Gly Leu Val Ala Gly Gly Leu Val Leu
        500   505   510

Leu Leu Pro Glu Thr Lys Gly Lys Ala Leu Pro Glu Thr Ile Glu Glu
      515   520   525

Ala Glu Asn Met Gln Arg Pro Arg Lys Asn Lys Glu Lys Met Ile Tyr
    530   535   540

Leu Gln Val Gln Lys Leu Asp Ile Pro Leu Asn
545   550   555

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<211> 554
<212> PRT
<213> Homo sapiens

<400> 8

Met Pro Thr Val Asp Asp Ile Leu Glu Gln Val Gly Glu Ser Gly Trp
1   5   10   15

Phe Gln Lys Gln Ala Phe Leu Ile Leu Cys Leu Leu Ser Ala Ala Phe
            20   25   30

Ala Pro Ile Cys Val Gly Ile Val Phe Leu Gly Phe Thr Pro Asp His
        35   40   45

His Cys Gln Ser Pro Gly Val Ala Glu Leu Ser Gln Arg Cys Gly Trp
    50   55   60

Ser Pro Ala Glu Glu Leu Asn Tyr Thr Val Pro Gly Leu Gly Pro Ala
65   70   75   80

Gly Glu Ala Phe Leu Gly Gln Cys Arg Arg Tyr Glu Val Asp Trp Asn
            85   90   95

Gln Ser Ala Leu Ser Cys Val Asp Pro Leu Ala Ser Leu Ala Thr Asn
            100   105   110

Arg Ser His Leu Pro Leu Gly Pro Cys Gln Asp Gly Trp Val Tyr Asp
        115   120   125

Thr Pro Gly Ser Ser Ile Val Thr Glu Phe Asn Leu Val Cys Ala Asp
    130   135   140

Ser Trp Lys Leu Asp Leu Phe Gln Ser Cys Leu Asn Ala Gly Phe Leu
145   150   155   160

Phe Gly Ser Leu Gly Val Gly Tyr Phe Ala Asp Arg Phe Gly Arg Lys
                165   170   175

Leu Cys Leu Leu Gly Thr Val Leu Val Asn Ala Val Ser Gly Val Leu
            180   185   190

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Met Ala Phe Ser Pro Asn Tyr Met Ser Met Leu Leu Phe Arg Leu Leu
     195   200   205

Gln Gly Leu Val Ser Lys Gly Asn Trp Met Ala Gly Tyr Thr Leu Ile
     210   215   220

Thr Glu Phe Val Gly Ser Gly Ser Arg Arg Thr Val Ala Ile Met Tyr
225   230   235   240

Gln Met Ala Phe Thr Val Gly Leu Val Ala Leu Thr Gly Leu Ala Tyr
         245   250   255

Ala Leu Pro His Trp Arg Trp Leu Gln Leu Ala Val Ser Leu Pro Thr
         260   265   270

Phe Leu Phe Leu Leu Tyr Tyr Trp Cys Val Pro Glu Ser Pro Arg Trp
         275   280   285

Leu Leu Ser Gln Lys Arg Asn Thr Glu Ala Ile Lys Ile Met Asp His
     290   295   300

Ile Ala Gln Lys Asn Gly Lys Leu Pro Pro Ala Asp Leu Lys Met Leu
305   310   315   320

Ser Leu Glu Glu Asp Val Thr Glu Lys Leu Ser Pro Ser Phe Ala Asp
         325   330   335

Leu Phe Arg Thr Pro Arg Leu Arg Lys Arg Thr Phe Ile Leu Met Tyr
         340   345   350

Leu Trp Phe Thr Asp Ser Val Leu Tyr Gln Gly Leu Ile Leu His Met
         355   360   365

Gly Ala Thr Ser Gly Asn Leu Tyr Leu Asp Phe Leu Tyr Ser Ala Leu
     370   375   380

Val Glu Ile Pro Gly Ala Phe Ile Ala Leu Ile Thr Ile Asp Arg Val
385   390   395   400

Gly Arg Ile Tyr Pro Met Ala Met Ser Asn Leu Leu Ala Gly Ala Ala
         405   410   415

Cys Leu Val Met Ile Phe Ile Ser Pro Asp Leu His Trp Leu Asn Ile
         420   425   430

Ile Ile Met Cys Val Gly Arg Met Gly Ile Thr Ile Ala Ile Gln Met
     435   440   445

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Ile Cys Leu Val Asn Ala Glu Leu Tyr Pro Thr Phe Val Arg Asn Leu
    450                 455             460

Gly Val Met Val Cys Ser Ser Leu Cys Asp Ile Gly Gly Ile Ile Thr
465             470             475                     480

Pro Phe Ile Val Phe Arg Leu Arg Glu Val Trp Gln Ala Leu Pro Leu
            485             490                 495

Ile Leu Phe Ala Val Leu Gly Leu Leu Ala Ala Gly Val Thr Leu Leu
            500             505             510

Leu Pro Glu Thr Lys Gly Val Ala Leu Pro Glu Thr Met Lys Asp Ala
        515             520             525

Glu Asn Leu Gly Arg Lys Ala Lys Pro Lys Glu Asn Thr Ile Tyr Leu
    530             535             540

Lys Val Gln Thr Ser Glu Pro Ser Gly Thr
545             550
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<212>   PRT
<213>   Homo sapiens

<400>   9
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Met Ala Phe Glu Glu Leu Leu Ser Gln Val Gly Gly Leu Gly Arg Phe
1               5               10                  15

Gln Met Leu His Leu Val Phe Ile Leu Pro Ser Leu Met Leu Leu Ile
            20              25              30

Pro His Ile Leu Leu Glu Asn Phe Ala Ala Ala Ile Pro Gly His Arg
            35              40              45

Cys Trp Val His Met Leu Asp Asn Asn Thr Gly Ser Gly Asn Glu Thr
    50              55              60

Gly Ile Leu Ser Glu Asp Ala Leu Leu Arg Ile Ser Ile Pro Leu Asp
65              70              75                      80

Ser Asn Leu Arg Pro Glu Lys Cys Arg Phe Phe Val His Pro Gln Trp
            85              90                      95

Gln Leu Leu His Leu Asn Gly Ile His Ser Thr Ser Glu Ala Asp Thr
            100             105             110
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Glu Pro Cys Val Asp Gly Trp Val Tyr Asp Gln Ser Tyr Phe Pro Ser
        115   120   125

Thr Ile Val Thr Lys Trp Asp Leu Val Cys Asp Tyr Gln Ser Leu Lys
    130   135   140

Ser Val Val Gln Phe Leu Leu Leu Thr Gly Met Leu Val Gly Gly Ile
145   150   155   160

Ile His His Gly Val Ser Asp Arg Phe Gly Arg Arg Phe Ile Leu Arg
                165   170   175

Trp Cys Leu Leu Gln Leu Ala Ile Thr Asp Thr Cys Ala Ala Phe Ala
        180   185   190

Pro Thr Phe Pro Val Tyr Cys Val Leu Arg Phe Leu Ala Gly Phe Ser
        195   200   205

Ser Met Ile Ile Ile Ser Asn Asn Ser Leu Pro Ile Thr Glu Trp Ile
    210   215   220

Arg Pro Asn Ser Lys Ala Leu Val Val Ile Leu Ser Ser Gly Ala Leu
225   230   235   240

Ser Ile Gly Gln Ile Ile Leu Gly Gly Leu Ala Tyr Val Phe Arg Asp
                245   250   255

Trp Gln Thr Leu His Val Val Ala Ser Val Pro Phe Leu Gly Leu Leu
        260   265   270

Leu Leu Gln Arg Trp Leu Val Glu Ser Ala Arg Trp Leu Ile Ile Thr
        275   280   285

Asn Lys Leu Asp Glu Gly Leu Lys Ala Leu Arg Lys Val Ala Arg Thr
    290   295   300

Asn Gly Ile Lys Asn Ala Glu Glu Thr Leu Asn Ile Glu Val Val Arg
305   310   315   320

Ser Thr Met Gln Glu Glu Leu Asp Ala Ala Gln Thr Lys Thr Thr Val
                325   330   335

Cys Asp Leu Phe Arg Asn Pro Ser Met Arg Lys Arg Ile Cys Ile Leu
        340   345   350

Val Phe Leu Arg Phe Ala Asn Thr Ile Pro Phe Tyr Gly Thr Met Val

             355   360   365

Asn Leu Gln His Val Gly Ser Asn Ile Phe Leu Leu Gln Val Leu Tyr
    370   375   380

Gly Ala Val Ala Leu Ile Val Arg Cys Leu Ala Leu Leu Thr Leu Asn
385   390   395   400

His Met Gly Arg Arg Ile Ser Gln Ile Leu Phe Met Phe Leu Val Gly
            405   410   415

Leu Ser Ile Leu Ala Asn Thr Phe Val Pro Lys Glu Met Gln Thr Leu
        420   425   430

Arg Val Ala Leu Ala Cys Leu Gly Ile Gly Cys Ser Ala Ala Thr Phe
        435   440   445

Ser Ser Val Ala Val His Phe Ile Glu Leu Ile Pro Thr Val Leu Arg
    450   455   460

Ala Arg Ala Ser Gly Ile Asp Leu Thr Ala Ser Arg Ile Gly Ala Ala
465   470   475   480

Leu Pro Leu Leu Met Thr Leu Thr Val Phe Phe Thr Thr Leu Pro Trp
            485   490   495

Ile Ile Tyr Gly Ile Phe Pro Ile Ile Gly Gly Leu Ile Val Phe Leu
            500   505   510

Leu Pro Glu Thr Lys Asn Leu Pro Leu Pro Asp Thr Ile Lys Asp Val
        515   520   525

Glu Asn Gln Lys Lys Asn Leu Lys Glu Lys Ala
    530   535

<210> 10
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<212> PRT
<213> Homo sapiens

<400> 10

Met Ala Phe Ser Lys Leu Leu Glu Gln Ala Gly Gly Val Gly Leu Phe
1   5   10   15

Gln Thr Leu Gln Val Leu Thr Phe Ile Leu Pro Cys Leu Met Ile Pro
            20   25   30

Ser Gln Met Leu Leu Glu Asn Phe Ser Ala Ala Ile Pro Gly His Arg
                         Page 84

Cys Trp Thr His Met Leu Asp Asn Gly Ser Ala Val Ser Thr Asn Met
    50   55   60

Thr Pro Lys Ala Leu Leu Thr Ile Ser Ile Pro Pro Gly Pro Asn Gln
65   70   75   80

Gly Pro His Gln Cys Arg Arg Phe Arg Gln Pro Gln Trp Gln Leu Leu
            85   90   95

Asp Pro Asn Ala Thr Ala Thr Ser Trp Ser Glu Ala Asp Thr Glu Pro
            100   105   110

Cys Val Asp Gly Trp Val Tyr Asp Arg Ser Val Phe Thr Ser Thr Ile
        115   120   125

Val Ala Lys Trp Asp Leu Val Cys Ser Ser Gln Gly Leu Lys Pro Leu
    130   135   140

Ser Gln Ser Ile Phe Met Ser Gly Ile Leu Val Gly Ser Phe Ile Trp
145   150   155   160

Gly Leu Leu Ser Tyr Arg Phe Gly Arg Lys Pro Met Leu Ser Trp Cys
            165   170   175

Cys Leu Gln Leu Ala Val Ala Gly Thr Ser Thr Ile Phe Ala Pro Thr
            180   185   190

Phe Val Ile Tyr Cys Gly Leu Arg Phe Val Ala Ala Phe Gly Met Ala
        195   200   205

Gly Ile Phe Leu Ser Ser Leu Thr Leu Met Val Glu Trp Thr Thr Thr
    210   215   220

Ser Arg Arg Ala Val Thr Met Thr Val Val Gly Cys Ala Phe Ser Ala
225   230   235   240

Gly Gln Ala Ala Leu Gly Gly Leu Ala Phe Ala Leu Arg Asp Trp Arg
            245   250   255

Thr Leu Gln Leu Ala Ala Ser Val Pro Phe Phe Ala Ile Ser Leu Ile
            260   265   270

Ser Trp Trp Leu Pro Glu Ser Ala Arg Trp Leu Ile Ile Lys Gly Lys
    275   280   285

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```
Pro Asp Gln Ala Leu Gln Glu Leu Arg Lys Val Ala Arg Ile Asn Gly
    290             295             300

His Lys Glu Ala Lys Asn Leu Thr Ile Glu Val Leu Met Ser Ser Val
305             310             315             320

Lys Glu Glu Val Ala Ser Ala Lys Glu Pro Arg Ser Val Leu Asp Leu
                325             330             335

Phe Cys Val Pro Val Leu Arg Trp Arg Ser Cys Ala Met Leu Val Val
            340             345             350

Asn Phe Ser Leu Leu Ile Ser Tyr Tyr Gly Leu Val Phe Asp Leu Gln
        355             360             365

Ser Leu Gly Arg Asp Ile Phe Leu Leu Gln Ala Leu Phe Gly Ala Val
    370             375             380

Asp Phe Leu Gly Arg Ala Thr Thr Ala Leu Leu Leu Ser Phe Leu Gly
385             390             395             400

Arg Arg Thr Ile Gln Ala Gly Ser Gln Ala Met Ala Gly Leu Ala Ile
            405             410             415

Leu Ala Asn Met Leu Val Pro Gln Asp Leu Gln Thr Leu Arg Val Val
            420             425             430

Phe Ala Val Leu Gly Lys Gly Cys Phe Gly Ile Ser Leu Thr Cys Leu
    435             440             445

Thr Ile Tyr Lys Ala Glu Leu Phe Pro Thr Pro Val Arg Met Thr Ala
    450             455             460

Asp Gly Ile Leu His Thr Val Gly Arg Leu Gly Ala Met Met Gly Pro
465             470             475             480

Leu Ile Leu Met Ser Arg Gln Ala Leu Pro Leu Leu Pro Pro Leu Leu
            485             490             495

Tyr Gly Val Ile Ser Ile Ala Ser Ser Leu Val Val Leu Phe Phe Leu
            500             505             510

Pro Glu Thr Gln Gly Leu Pro Leu Pro Asp Thr Ile Gln Asp Leu Glu
            515             520             525

Ser Gln Lys Ser Thr Ala Ala Gln Gly Asn Arg Gln Glu Ala Val Thr
    530             535             540
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Val Glu Ser Thr Ser Leu
545   550

<210>   11
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<213>   Homo sapiens

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Met Thr Phe Ser Glu Ile Leu Asp Arg Val Gly Ser Met Gly His Phe
1   5   10   15

Gln Phe Leu His Val Ala Ile Leu Gly Leu Pro Ile Leu Asn Met Ala
                20   25   30

Asn His Asn Leu Leu Gln Ile Phe Thr Ala Ala Thr Pro Val His His
            35   40   45

Cys Arg Pro Pro His Asn Ala Ser Thr Gly Pro Trp Val Leu Pro Met
        50   55   60

Gly Pro Asn Gly Lys Pro Glu Arg Cys Leu Arg Phe Val His Pro Pro
65   70   75   80

Asn Ala Ser Leu Pro Asn Asp Thr Gln Arg Ala Met Glu Pro Cys Leu
                85   90   95

Asp Gly Trp Val Tyr Asn Ser Thr Lys Asp Ser Ile Val Thr Glu Trp
                100   105   110

Asp Leu Val Cys Asn Ser Asn Lys Leu Lys Glu Met Ala Gln Ser Ile
            115   120   125

Phe Met Ala Gly Ile Leu Ile Gly Gly Leu Val Leu Gly Asp Leu Ser
        130   135   140

Asp Arg Phe Gly Arg Arg Pro Ile Leu Thr Cys Ser Tyr Leu Leu Leu
145   150   155   160

Ala Ala Ser Gly Ser Gly Ala Ala Phe Ser Pro Thr Phe Pro Ile Tyr
                165   170   175

Met Val Phe Arg Phe Leu Cys Gly Phe Gly Ile Ser Gly Ile Thr Leu
                180   185   190

Ser Thr Val Ile Leu Asn Val Glu Trp Val Pro Thr Arg Met Arg Ala
            195   200   205

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Ile Met Ser Thr Ala Leu Gly Tyr Cys Tyr Thr Phe Gly Gln Phe Ile
210   215   220

Leu Pro Gly Leu Ala Tyr Ala Ile Pro Gln Trp Arg Trp Leu Gln Leu
225   230   235   240

Thr Val Ser Ile Pro Phe Phe Val Phe Phe Leu Ser Ser Trp Trp Thr
                245   250   255

Pro Glu Ser Ile Arg Trp Leu Val Leu Ser Gly Lys Ser Ser Glu Ala
                260   265   270

Leu Lys Ile Leu Arg Arg Val Ala Val Phe Asn Gly Lys Lys Glu Glu
            275   280   285

Gly Glu Arg Leu Ser Leu Glu Glu Leu Lys Leu Asn Leu Gln Lys Glu
    290   295   300

Ile Ser Leu Ala Lys Ala Lys Tyr Thr Ala Ser Asp Leu Phe Arg Ile
305   310   315   320

Pro Met Leu Arg Arg Met Thr Phe Cys Leu Ser Leu Ala Trp Phe Ala
                325   330   335

Thr Gly Phe Ala Tyr Tyr Ser Leu Ala Met Gly Val Glu Glu Phe Gly
            340   345   350

Val Asn Leu Tyr Ile Leu Gln Ile Ile Phe Gly Gly Val Asp Val Pro
    355   360   365

Ala Lys Phe Ile Thr Ile Leu Ser Leu Ser Tyr Leu Gly Arg His Thr
    370   375   380

Thr Gln Ala Ala Ala Leu Leu Leu Ala Gly Gly Ala Ile Leu Ala Leu
385   390   395   400

Thr Phe Val Pro Leu Asp Leu Gln Thr Val Arg Thr Val Leu Ala Val
                405   410   415

Phe Gly Lys Gly Cys Leu Ser Ser Ser Phe Ser Cys Leu Phe Leu Tyr
            420   425   430

Thr Ser Glu Leu Tyr Pro Thr Val Ile Arg Gln Thr Gly Met Gly Val
    435   440   445

Ser Asn Leu Trp Thr Arg Val Gly Ser Met Val Ser Pro Leu Val Lys
    450   455   460

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Ile Thr Gly Glu Val Gln Pro Phe Ile Pro Asn Ile Ile Tyr Gly Ile
465                 470             475             480

Thr Ala Leu Leu Gly Gly Ser Ala Ala Leu Phe Leu Pro Glu Thr Leu
                485             490             495

Asn Gln Pro Leu Pro Glu Thr Ile Glu Asp Leu Glu Asn Trp Ser Leu
            500             505             510

Arg Ala Lys Lys Pro Lys Gln Glu Pro Glu Val Glu Lys Ala Ser Gln
        515             520             525

Arg Ile Pro Leu Gln Pro His Gly Pro Gly Leu Gly Ser Ser
    530             535             540
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<213> Homo sapiens

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Met Ala Phe Asn Asp Leu Leu Gln Gln Val Gly Gly Val Gly Arg Phe
1               5               10              15

Gln Gln Ile Gln Val Thr Leu Val Val Leu Pro Leu Leu Leu Met Ala
            20              25              30

Ser His Asn Thr Leu Gln Asn Phe Thr Ala Ala Ile Pro Thr His His
        35              40              45

Cys Arg Pro Pro Ala Asp Ala Asn Leu Ser Lys Asn Gly Gly Leu Glu
    50              55              60

Val Trp Leu Pro Arg Asp Arg Gln Gly Gln Pro Glu Ser Cys Leu Arg
65              70              75              80

Phe Thr Ser Pro Gln Trp Gly Leu Pro Phe Leu Asn Gly Thr Glu Ala
                85              90              95

Asn Gly Thr Gly Ala Thr Glu Pro Cys Thr Asp Gly Trp Ile Tyr Asp
            100             105             110

Asn Ser Thr Phe Pro Ser Thr Ile Val Thr Glu Trp Asp Leu Val Cys
        115             120             125

Ser His Arg Ala Leu Arg Gln Leu Ala Gln Ser Leu Tyr Met Val Gly
    130             135             140
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Val Leu Leu Gly Ala Met Val Phe Gly Tyr Leu Ala Asp Arg Leu Gly
145   150   155   160

Arg Arg Lys Val Leu Ile Leu Asn Tyr Leu Gln Thr Ala Val Ser Gly
            165   170   175

Thr Cys Ala Ala Phe Ala Pro Asn Phe Pro Ile Tyr Cys Ala Phe Arg
            180   185   190

Leu Leu Ser Gly Met Ala Leu Ala Gly Ile Ser Leu Asn Cys Met Thr
            195   200   205

Leu Asn Val Glu Trp Met Pro Ile His Thr Arg Ala Cys Val Gly Thr
    210   215   220

Leu Ile Gly Tyr Val Tyr Ser Leu Gly Gln Phe Leu Leu Ala Gly Val
225   230   235   240

Ala Tyr Ala Val Pro His Trp Arg His Leu Gln Leu Leu Val Ser Ala
            245   250   255

Pro Phe Phe Ala Phe Phe Ile Tyr Ser Trp Phe Phe Ile Glu Ser Ala
            260   265   270

Arg Trp His Ser Ser Ser Gly Arg Leu Asp Leu Thr Leu Arg Ala Leu
    275   280   285

Gln Arg Val Ala Arg Ile Asn Gly Lys Arg Glu Glu Gly Ala Lys Leu
    290   295   300

Ser Met Glu Val Leu Arg Ala Ser Leu Gln Lys Glu Leu Thr Met Gly
305   310   315   320

Lys Gly Gln Ala Ser Ala Met Glu Leu Leu Arg Cys Pro Thr Leu Arg
            325   330   335

His Leu Phe Leu Cys Leu Ser Met Leu Trp Phe Ala Thr Ser Phe Ala
            340   345   350

Tyr Tyr Gly Leu Val Met Asp Leu Gln Gly Phe Gly Val Ser Ile Tyr
    355   360   365

Leu Ile Gln Val Ile Phe Gly Ala Val Asp Leu Pro Ala Lys Leu Val
    370   375   380

Gly Phe Leu Val Ile Asn Ser Leu Gly Arg Arg Pro Ala Gln Met Ala

385   390   395   400

Ala Leu Leu Leu Ala Gly Ile Cys Ile Leu Leu Asn Gly Val Ile Pro
                    405   410   415

Gln Asp Gln Ser Ile Val Arg Thr Ser Leu Ala Val Leu Gly Lys Gly
                420   425   430

Cys Leu Ala Ala Ser Phe Asn Cys Ile Phe Leu Tyr Thr Gly Glu Leu
            435   440   445

Tyr Pro Thr Met Ile Arg Gln Thr Gly Met Gly Met Gly Ser Thr Met
    450   455   460

Ala Arg Val Gly Ser Ile Val Ser Pro Leu Val Ser Met Thr Ala Glu
465   470   475   480

Leu Tyr Pro Ser Met Pro Leu Phe Ile Tyr Gly Ala Val Pro Val Ala
                485   490   495

Ala Ser Ala Val Thr Val Leu Leu Pro Glu Thr Leu Gly Gln Pro Leu
                500   505   510

Pro Asp Thr Val Gln Asp Leu Glu Ser Arg Lys Gly Lys Gln Thr Arg
            515   520   525

Gln Gln Gln Glu His Gln Lys Tyr Met Val Pro Leu Gln Ala Ser Ala
    530   535   540

Gln Glu Lys Asn Gly Leu
545   550 .

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ggcacattta ttcaccaaga ccag   24

<210> 14
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<223> Chemically synthesized

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tgtggacctc agcagcattt ggat   24